9/15/16

"Quality is not an act, it is a habit." -Aristotle

HW: "Rationalizing a Denominator" worksheet #3-37 odd

AIM: How do we Rationalize a Denominator?

Warm Up:

1) Simplify the following:

$$\frac{\sqrt{48}+\sqrt{3}}{\sqrt{3}}$$

split into 2 fractions

$$\frac{1}{2}+\frac{5}{2}=\frac{1+5}{2}$$

$$\frac{\sqrt{48}}{\sqrt{3}}+\frac{\sqrt{3}}{\sqrt{3}}$$

$$\sqrt{16}+\sqrt{1}$$

$$4+1=5$$

2) $\dfrac{5}{\sqrt{10}} \cdot \dfrac{\sqrt{10}}{\sqrt{10}} = \dfrac{\cancel{5}^{1}\sqrt{10}}{\cancel{10}_{2}} = \boxed{\dfrac{\sqrt{10}}{2}}$

$\sqrt{100}=10$

3) $\dfrac{4}{2\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{4\sqrt{3}}{2 \cdot 3} = \dfrac{\cancel{4}^{2}\sqrt{3}}{\cancel{6}_{3}} = \boxed{\dfrac{2\sqrt{3}}{3}}$

$\sqrt{9}=3$

ALT: $\dfrac{\cancel{4}^{2}}{\cancel{2}_{1}\sqrt{3}} = \dfrac{2}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \boxed{\dfrac{2\sqrt{3}}{3}}$

4) $\dfrac{1}{5-\sqrt{2}} \cdot \dfrac{5+\sqrt{2}}{5+\sqrt{2}}$

Conjugates
$(5-\sqrt{2})(5+\sqrt{2})$
DOTS

$\dfrac{5+\sqrt{2}}{25\underbrace{\boxed{+5\sqrt{2}-5\sqrt{2}}}_{\text{Cancel}}-2} = \dfrac{5+\sqrt{2}}{25-2} = \boxed{\dfrac{5+\sqrt{2}}{23}}$

(*) To rationalize a <u>binomial</u> denominator we multiply both the top and bottom by the conjugate of the denominator.

Conjugates are the exact same terms but with opposite signs.

<u>Ex:</u> $5+\sqrt{7}$ and $5-\sqrt{7}$

$(4+\sqrt{7})(4-\sqrt{7})$

5) $$\frac{4}{4+\sqrt{7}} \cdot \frac{4-\sqrt{7}}{4-\sqrt{7}} = \frac{16-4\sqrt{7}}{16\underbrace{-4\sqrt{7}+4\sqrt{7}}_{\text{Cancel}}-7} = \frac{16-4\sqrt{7}}{16-7}$$

$$\Downarrow$$

$$\boxed{\frac{16-4\sqrt{7}}{9}}$$